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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,970	10/24/2003	David A. Boyles	4775-4	1817

22442 7590 01/13/2006

SHERIDAN ROSS PC
1560 BROADWAY
SUITE 1200
DENVER, CO 80202

EXAMINER

BOYKIN, TERRESSA M

ART UNIT	PAPER NUMBER
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1711

DATE MAILED: 01/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/692,970

Applicant(s)

BOYLES ET AL.

Examiner

Terressa M. Boykin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) 9-16 and 25-38 is/are withdrawn from consideration.
- 5) ☒ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 5-8, 17 and 23 is/are rejected.
- 7) ☐ Claim(s) 2, 3, 4, 18, 19, 20, 21, 22, 24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Argument/Amendment

Applicant's arguments/amendments with respect to claims 9-16, 25-38 are appreciated and have been entered. However, in view of a recent structural search report some of the claims 1-8 and 17 -24 have been reconsidered and found to be anticipated as noted below in the new ground(s) of rejection.

Objected Claims

Claims 2,3,4 18,19,20,21,22,24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1,5,6,7,8,17, 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Virgil Percec et al."Molecular design of novel liquid crystalline polymers with complex architecture: Macrocyclics and dendrimers" Pure & Apl. Chem. Vol. 67, No. 12, pp. 2031-2038, 1995;

Percec discloses the **molecular design** of two novel classes of liquid crystals with complex architecture, i.e., supramolecular quasi-rigid-rods generated from collapsed

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macrocyclics and dendrimers based on flexible AB2 monomers, which exhibit conformational isomerism.

Note with regard to figure 2:

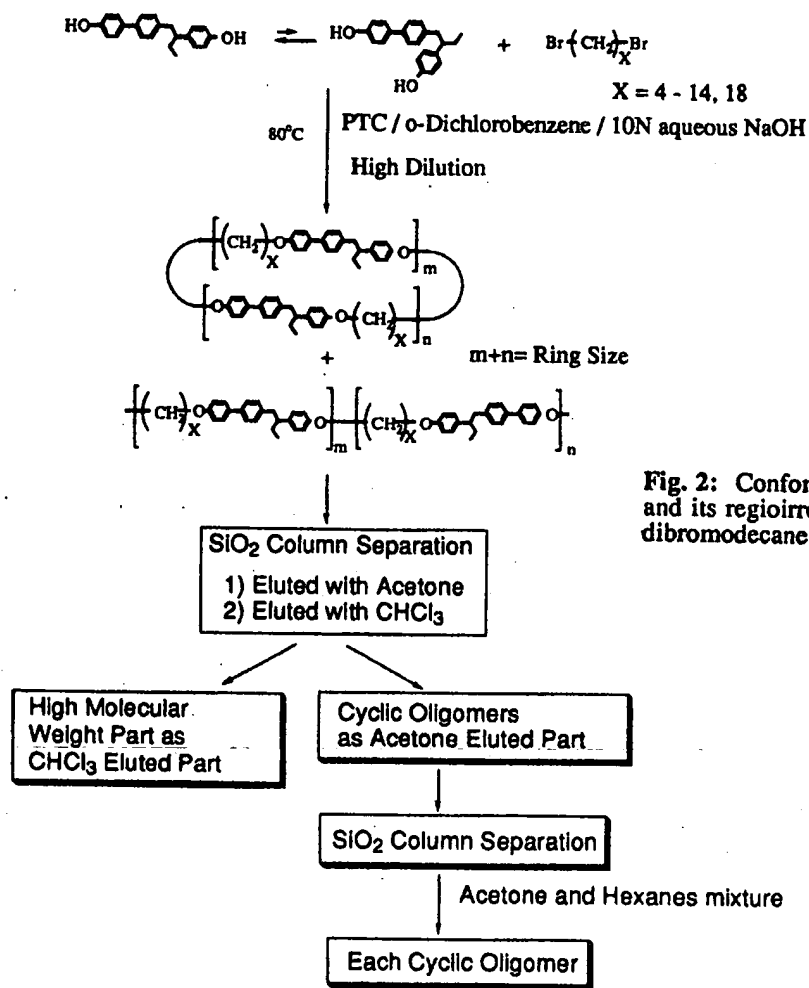


Fig. 2: Conformational isomerism of TPB and its regioirregular cyclization with 1,10-dibromodecane under high-dilution conditions.

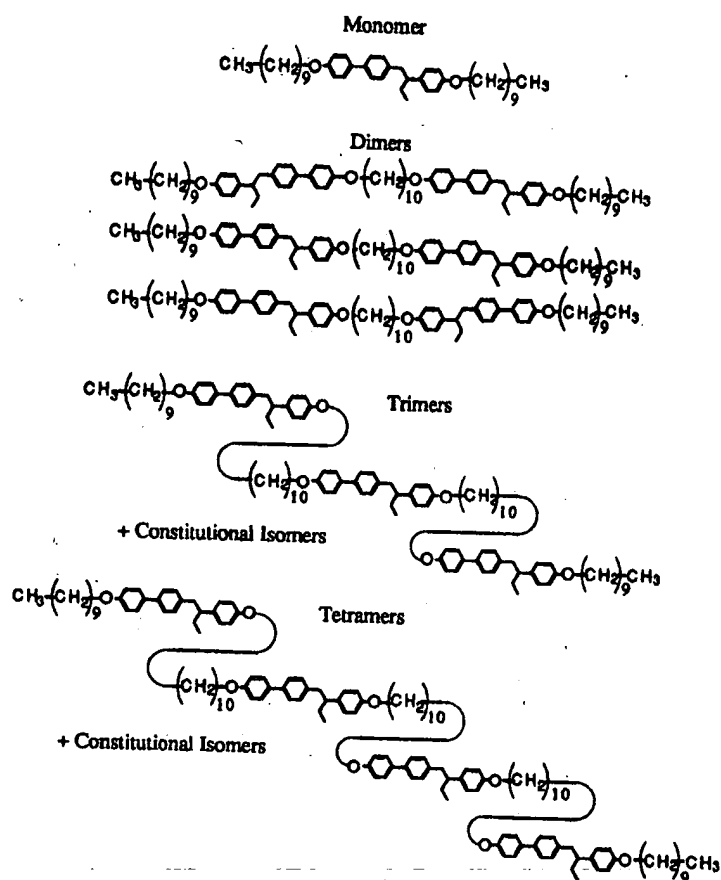
Molecular design of novel liquid crystalline polymers

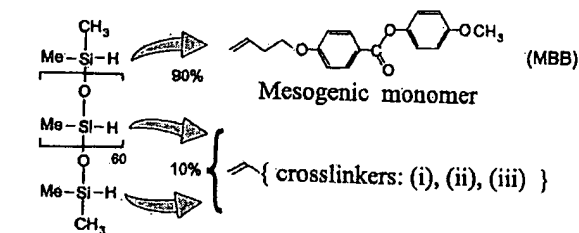
Fig. 3: The structures of the linear regioirregular model compounds of TPB-(I)10.

Claims 1,5,6,7,8,17, 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Clark et al. Physical Review E, vol. 64 no. 061702 pp -1-6

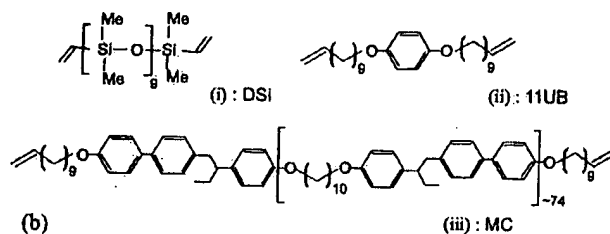
The reference discloses cross linker geometry on equilibrium thermal and mechanical properties of nematic elastomers.

Note with regard to figure 1:

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(a)



(b)

FIG. 1. Schematic illustration of the materials used in this paper. (a) Siloxane backbone chain with Si-H groups reacting with 90 mol % mesogenic phenyl-benzoate side groups, MBB, and 10 mol % of divinyl cross-linking groups: (b) flexible siloxane chain, DSI (giving the SiF sample), flexible small-molecule 1,4-alkeneoxybenzene, 11UB (resulting in the SiH material), and the main-chain nematic polymer of 1-biphenyl-2-phenyl butane, MC (giving the two SiMC materials).

Claims 1,5,6,7,8,17, 23 are rejected under 35 U.S.C. 102(b and e respectively) as being anticipated by Coleen Pugh and Virgil Percec: Synthesis of thermotropic side chain liquid crystal polymers, Macromolecular Chemistry and Physics, vol. 201, Issue 12, pages 1303-1310, Aug 10,2000.

Pugh et al. Discloses the synthesis of thermotropic side-chain liquid crystalline polymers containing a poly(2,6-dimethyl-1,4-phenylene oxide) main chains.

Specifically the reference discloses Poly(2,6-dimethyl-1,4-phenylene oxide) (PPO) containing pendant mesogenic units separated from the polymer main-chain through spacers of three to ten methylene units were synthesized and characterized. The synthetic pathway used for the chemical modification of PPO involved the radical bromination of its methyl groups followed by phase transfer catalyzed esterification of

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the resulting bromobenzyl groups with potassium ω -(4-oxybiphenyl)alkanoates and potassium ω -(4-methoxy-4'-oxybiphenyl)alkanoates. Only the resulting polymers containing ten methylene units as spacer and 4,4'-methoxybiphenyl as mesogen present thermotropic liquid crystalline mesomorphism.

Claims 1,5,6,7,8,17, 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Christoph Wutz and Dana Schleyer: "Conformation of spacers in smectic poly(ester imide)s" Institut für Technische und Makromolekulare Chemie, Universität Hamburg, Bundesstrasse 45, D-20146 Hamburg, Germany Received: 23 June 1997; Accepted: 3 March 1998.

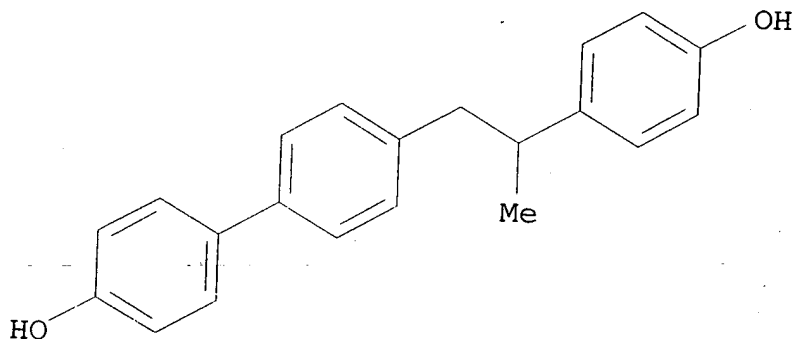
The abstract by Christoph Wutz et al. discloses several poly(ester imide)s based on 4-N-(carboxyphenyl)trimellitimide, 4-N-(carboxyethenylphenyl)trimellitimide, 4-hydroxy-N-(4-hydroxyphenyl)phthalimide and long aliphatic spacers have been investigated by different solid-state NMR techniques. The conformations of the methylene units were studied by the γ -gauche effect of the ^{13}C chemical shift. In the frozen smectic LC phase, an alternating sequence of trans-conformations and disordered segments is predominant. In contrast, the spacers in the smectic-crystalline phase are capable of forming ordered trans-trans conformations. The amount of t-conformations is found to increase with the spacer length and depend on the packing of the mesogens and the type of linkage between mesogen and spacer. The thermal stability above 100°C and the segmental mobility of the tt-conformations, as measured by $^{13}\text{C}/^1\text{H}$ wide line separation NMR, suggest a ropelike arrangement of the spacers. The tt-sequences are located in the outer parts rather than in the center of the spacer layer. Dephasing delay

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experiments on analogous polymers, which are deuteriated selectively in the four central methylene groups of the spacers, prove that these segments do not contain tt-conformations. Consequently, the ordering is due to the molecular constraints exerted by the rigid mesogenic groups and not by lateral van der Waals interactions between adjacent spacer segments. In a random copolymer with two different spacer lengths, the shorter spacer is found to be more extended than in the corresponding homopolymer.

It is noted that in each of the above references, an extensive structure search located in each instances the presence of one or both of the following structures according to the CAS system:

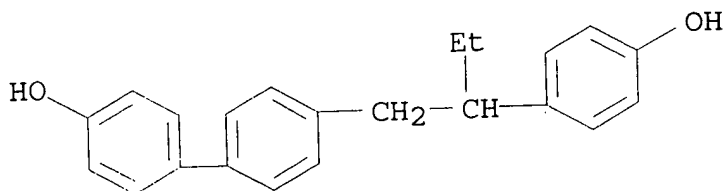
Note the structures as follows:



CM 2

CRN 136443-81-7
CMF C22 H22 O2

CRN 16696-65-4
CMF C11 H22 Br2



CM 2

CRN 4101-68-2
CMF C10 H20 Br2

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Thus, in view of the above, there appears to be no significant difference between the monomer structure in each the references and that which is claimed by applicant(s). Any differences not specifically mentioned appear to be conventional such as the hydrolyzes of the end units to produce OH groups or OR (alkyl) . Consequently, the claimed invention cannot be deemed as novel and accordingly is unpatentable.

* USP 4806601 and JP 2003-146924 have been of record as of interest.

Correspondence

Please note that the cited U.S. patents and patent application publications are available for download via the Office's PAIR. As an alternate source, all U.S. patents and patent application publications are available on the USPTO web site (www.uspto.gov), from the Office of Public Records and from commercial sources. Applicants may be referred to the Electronic Business Center (EBC) at <http://www.uspto.gov/ebc/index.html> or 1-866-217-9197.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Terressa Boykin whose telephone number is 571 272-1069. The examiner can normally be reached on Monday through Friday from 6:30am to 3:00pm.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. The general information number for listings of personnel is (571-272-1700).

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

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published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

tmb



Examiner Terressa Boykin

Primary Examiner

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